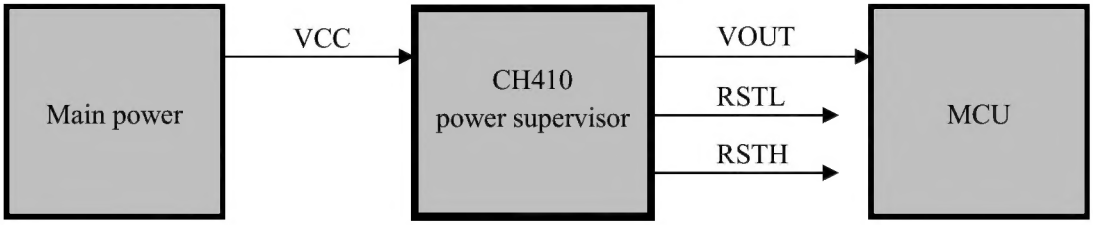
Power Supervisor CH410

Datasheet
Version: 1B
http://wch.cn

1. Overview

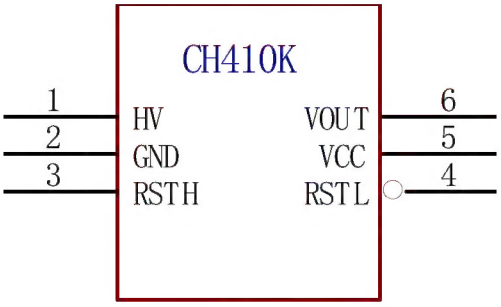
CH410 is a power supervisor, used to monitor the input supply voltage (VCC) and generate power on reset signal and low voltage reset signal. When VCC reaches the threshold voltage, VOUT power is output after a delay of several milliseconds. When VCC is below the threshold voltage, VOUT power is immediately turned off and discharged. The figure below shows a block diagram of general application.



2. Features

- Monitors power state changes, and converts input slow rising power or jittering power into reliable power.
- Built-in power on reset. Provides power-on, low-voltage and delay reset signals
- Provides active-high or active-low reset signals. Active-low reset is an open-drain output.
- Supports 5V, 3.3V or even 2.5Vpower supply.
- SOT363 (SC70-6L) small outline no-lead package, RoHS compliant.

3. Package



Package	Body size		Lead pitch		Description	Part No.
SOT363	1.25mm	49mil	0.65mm	26mil	Small outline 6-pin patch	CH410K

Note: The packing type of CH410K is tray. The number of chips packaged per tray is 3000. The topside of CH410K is printed with only “10” (product identification).

4. Pin definitions

Pin No.	Pin Name	Pin Type	Description
5	VCC	Power	Positive power input. The value of the external decoupling capacitor is recommended to be greater than 5 times of VOUT.
2	GND	Power	Ground
6	VOUT	Power output Push-pull output	Power output, built-in low voltage discharge. Also can be active-low reset output.
4	RSTL	Open-drain output	Power-on and low-voltage reset output, active low
3	RSTH	Push-pull output	Power-on and low-voltage reset output, active high
1	HV	Analog input	Threshold voltage setting input: 2.3V low voltage is selected when HV is suspended (cannot be connected to GND). 3V high voltage is selected when HV is shorted to VCC. The above are rated values, internally inexact comparison, discrete.

5. Parameters

5.1. Absolute maximum ratings

Stresses at or above the absolute maximum ratings listed in the table below may cause permanent damage to the device.

Symbol	Parameter description	Min.	Max.	Unit
TA	Operating ambient temperature	-40	85	℃
TS	Storage ambient temperature	-55	125	℃
VCC	Supply voltage (VCC connects to power, GND to ground)	-0.5	6.0	V
VIO	Voltage on input/output pins	-0.5	VCC+0.5	V

5.2. Electrical characteristics

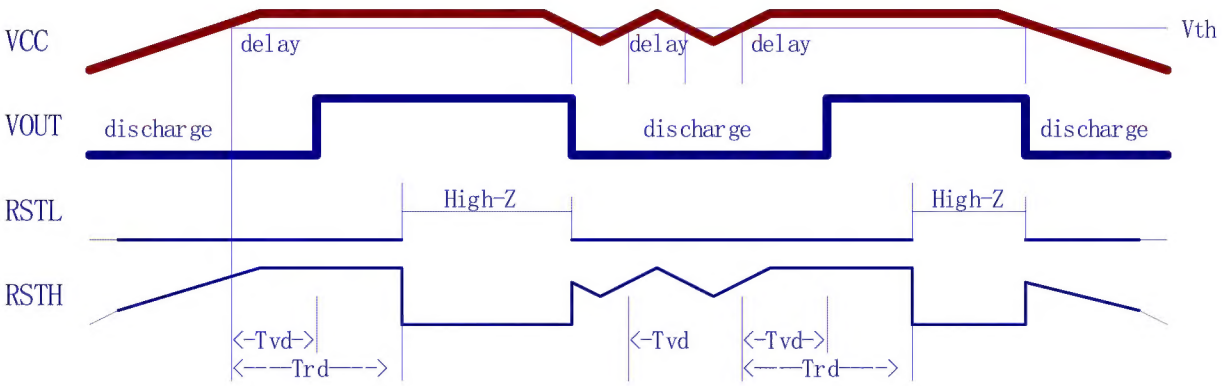
Test conditions: TA=25℃, VCC=3.3V.

Symbol	Parameter description		Min.	Typ.	Max.	Unit
VCC	Supply voltage		1.0	3.3	5.3	V
ICCR	Supply current during reset			50	1000	uA
ICC3	Supply current during normal operation after reset	VCC=3.3V		0.5	1	uA
ICC5		VCC=5V		1.0	2	uA
Vth23	Threshold voltage when the HV pin is suspended		2.0	2.25	2.45	V
Vth30	Threshold voltage when the HV pin is connected to VCC		2.7	2.95	3.15	V
VOL	Low level output voltage (I_{IL}=10mA)			0.3	0.5	V
VOH	High level output voltage (I_{OH}=5mA)		VCC-0.5	VCC-0.3		V

Ivout	Output supply current on VOUT pin				35	mA
Vdrop3	Voltage difference (voltage drop) between VCC and VOUT when VOUT outputs 20mA current	VCC=3.3V		45	60	mV
Vdrop5		VCC=5V		35	45	mV
Idisch	VOUT pin discharge current			20	35	mA
Cvout	Load capacitance supported by VOUT (MCU decoupling capacitance)		0.01	1	22	uF
Cpin	Parasitic capacitance of RSTL pin			3	6	pF

5.3. Timing parameters

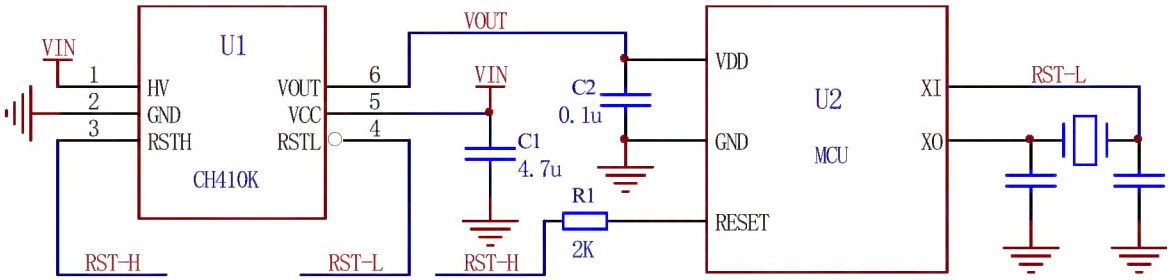
Test conditions: TA=25°C, VCC=3.3V.



Symbol	Parameter description	Min.	Typ.	Max.	Unit
Tvd	Delay from voltage rise to the threshold voltage to the start of power supply	3	5	8	mS
Trd	Delay from voltage rise to the threshold voltage to the end of reset	100	165	230	mS
Tvdf	Delay from voltage drop below threshold voltage to start of discharge	0.005	0.02	1	uS

6. Application

6.1. Power monitor (figure below)



The capacitance of C1 is recommended to be greater than 5 times that of C2, and not less than 4.7uF. VIN is

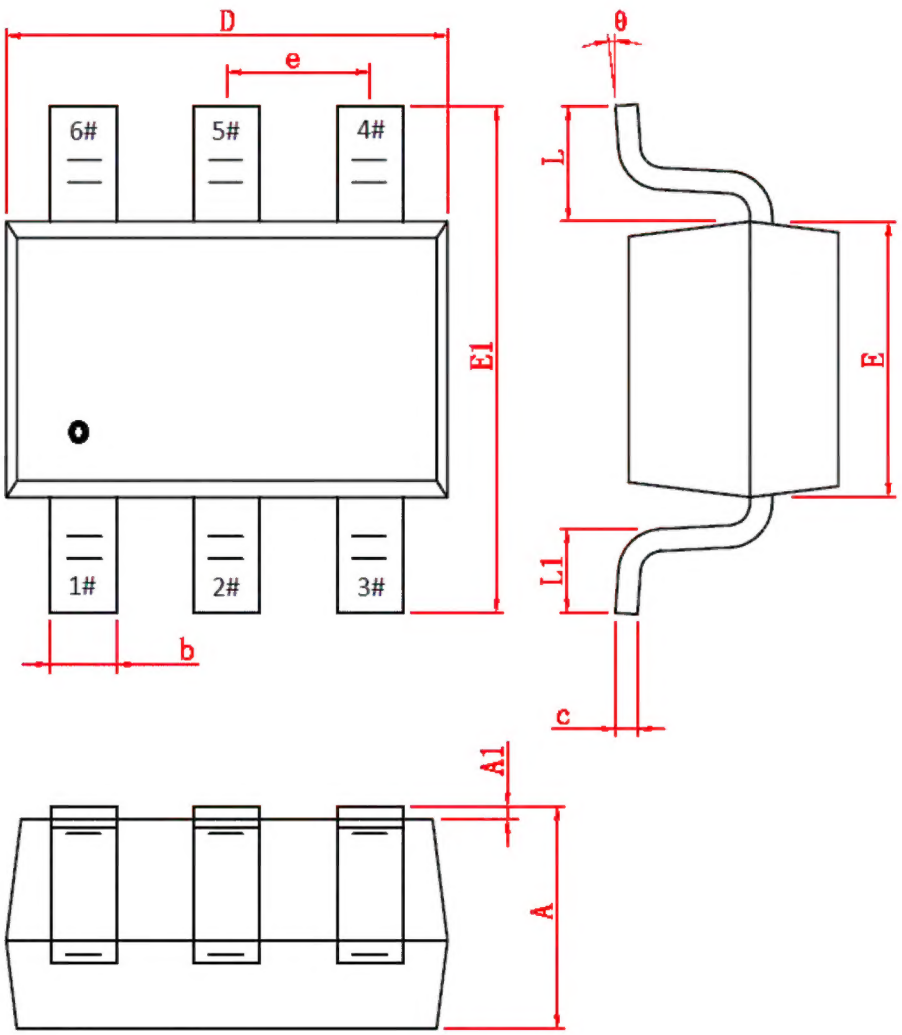
the power supply input. If a larger supply current is required, RSTH can be used to drive an external PMOS to provide more than 1A of current. During the period when the VIN supply voltage is slowly rising, RSTH and RSTL first maintain reset output. When VIN reaches the threshold voltage, VOUT starts to output power after a delay. After more delay, RSTH and RSTL end the reset.

RSTH and RSTL are optional connections. RSTH outputs high level during reset, and it is possible to reverse current to the MCU through the MCU pin, and R1 can be selected to limit this current. RSTL is an open-drain output pin that can be used to control the crystal oscillator. If it is used to drive the MCU's active-low reset pin, an additional VOUT pull-up resistor may be required.

7. Package information

SOT363 (SC70-6L) package dimensions

Symbol	Dimensions in mm			Dimensions in mil		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.9	1.0	1.1	35	39	43
A1	0.0	0.05	0.1	0	2	4
b	0.15	0.25	0.35	6	10	14
c	0.08	0.12	0.15	3	5	6
D	2.0	2.1	2.2	79	83	87
E	1.15	1.25	1.35	45	49	53
E1	2.15	2.3	2.45	85	91	96
e		0.65			26	
L		0.53			21	
L1	0.25	0.35	0.45	10	14	18
θ	0°		8°	0°		8°


D
e
θ
6#
5#
4#
L
E1
E
L1
1#
2#
3#
b
c
A1
A